Application of United States Department of Interior
Bureau of Reclamation
Water Reservation No. 72579-41T

II. FINDINGS OF FACT

A. FINDINGS ON THE QUALIFICATION OF THE U.S. BUREAU OF RECLAMATION TO RESERVE WATER (Mont. Code Ann. § 85-2-316(1)(1991); ARM 36.16.107B(1)(a).

1. The United States Department of the Interior, Bureau of Reclamation, hereinafter Bureau of Reclamation, is a federal agency (Bd. Exh. 36-A.2, p. 2) and a qualified reservant pursuant to Mont. Code Ann. § 85-2-316. (Bd. Exh. A, p. 2).

2. The Bureau of Reclamation has applied to reserve an annual amount of 89,000 acre-feet of water to be diverted at a maximum rate of 280 cfs to provide irrigation for lands in the Milk River drainage totaling 53,600 acres; and deliver water to the Lake Bowdoin National Wildlife Refuge and the town of Chinook. (BOR Exh. 13, Mercer Dir., p. 1; Bd. Exh. 36-C, p. 1).

B. FINDINGS ON THE PURPOSE OF THE WATER RESERVATION APPLIED FOR BY THE Bureau of Reclamation (Mont. Code Ann. § 85-2-316(4)(a)(1991); ARM 36.16.107B(1)(b).

3. The Bureau of Reclamation seeks to reserve water for future irrigation, fish and wildlife purposes and municipal purposes. (Bd. Exh. 36-A, p. 5). Irrigation, fish and wildlife purposes and municipal purposes are beneficial uses as defined by ARM 36.16.102(3).

C. FINDINGS ON THE NEED FOR THE WATER RESERVATION APPLIED FOR BY THE Bureau of Reclamation (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

4. The Bureau of Reclamation has established a need for the reservation pursuant to ARM 36.16.107B(2) based on the following:

a) water use in the Missouri River basin and existing water rights together with new permits could leave little water available for future use by the Bureau of Reclamation for these purposes. A priority date of July 11, 1985 allows water use by the applicant. If users in the Milk River basin are to be assured an adequate supply of water for irrigation, wildlife and municipal uses as early priority date for the water must be preserved. (Bd. Exh. 36-A.1, p. 6, 7). Furthermore, the potential exists for conflict with downstream states over water use in the Missouri River basin. (Bd. Exh. 36-A.1, p. 6, 7).

b) The Bureau of Reclamation desires to improve long-term planning for its water use and there are at present economic constraints to near term development on a permit basis. If water were not reserved, it could be appropriated by competing uses in Montana or downstream states. (Bd. Exh. 40, p. 248).

D. FINDINGS ON THE AMOUNT OF WATER NEEDED FOR THE WATER RESERVATION APPLIED FOR BY THE Bureau of Reclamation (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3)).

5. The Bureau of Reclamation has applied for a water reservation at a flow rate of 280 cfs to serve 53,600 acres of land with irrigation water. Of these 53,6000 acres approximately 33,000 are for lands served by junior water rights on the Milk River. (Bd. Exh. 36-A.1, p.8). Approximately 8,000 of the junior water rights acres are classified as class 6 lands due to drainage, topography or soils. (Bd. Exh. 36-A.1, p. 8).

6. The application is supported by two lengthy documents. The first of these is Attachment B to the Application (Bd. Exh. 36-A.2) called "Special Report Summarizing the Milk River Water Supply" (July, 1990), hereinafter referred to as "Special Report". The second, (Bd. Exh. 36-A.2) is entitled "Milk River Water Supply Study Plan Formulation Working Document", hereinafter referred to as PFWD.

7. Both the Special Report and the PFWD set forth a three-part plan for improving water supply in the Milk River. Phase One of the plan consists of among other efforts organizing a joint board of control for Milk River irrigators and restoring the St. Mary Canal. (Special Report, Bd. Exh. 36-A.2, Attachment B, p. 5-3; Mercer Cross, Tr. Day 5, p. 175).

8. Phase Two of the Plan is to improve efficiencies of water use and make other water use improvements (Special Report, Bd. Exh. 36-A.2, Attachment B, p. 5-3).

9. Phase Three of the project is formulated to provide adequate water supply for landowners with junior water rights, Indian reservations, Bowdoin National Wildlife Reservation, and the Town of Chinook with water from the Missouri River. (Special Report at 5-6).

10. According to the Special Report the preferred alternative for Phase Three is the construction of a pump station located upstream of Boggs Island on the Missouri River with a canal of approximately 46 miles in length to move the Missouri to the Milk River. (Special Report, Bd. Exh. 36-A.2, Attachment B, p. 5-6). This is also the preferred alternative of the PFWD. (PFWD, Bd. Exh. 36-A.2, p. 5-6).

11. The preferred alternative sets forth the construction of a 230 cfs pump plant and 230 cfs capacity canal not the 280 cfs diversion set forth in the application. (Special Report, Bd Exh. 36-A.2, Attachment B, p. 5-6; Mercer Cross, Tr. Day 5, p. 112).

12. The Phase Three plan with the 230 cfs diversion was formulated to provide an adequate water supply to the landowners with junior water rights, to the Gros Ventre-Assiniboine Tribes on the Fort Belknap Reservation for irrigation, to the Bureau of Land Management for stockwater ponds, to the Bowdoin National Wildlife Refuge for wildlife and recreation purposes, and to the Town of Chinook for municipal purposes. Water for irrigation purposes would also be provided to landowners along the canal including the Chippewa Cree Tribe on the Rocky Boy's Reservation. (Special Report, p. 4-3).

13. During dry years 68,000 acre-feet of water would be diverted for these uses. Of this, 47,100 would be for irrigation and 20,900 for non-irrigation purposes. (Special Report, p. 4-28).

14. The diversion rate and amounts set forth in the Special Report (Bd. Exh. 36-A.2, Attachment B) and not the diversion rate and amounts set forth in the application are what is needed by the applicant.

15. Taking into account the above reduction which conforms the application to its supporting documents, the Bureau of Reclamation has established methodologies used in determining the amounts requested, and that the water-use efficiencies associated with the diversionary uses are suitable as required by ARM 36.16 107B(3).

E. FINDINGS THAT THE WATER RESERVATION APPLIED FOR BY THE BUREAU OF RECLAMATION IS IN THE PUBLIC INTEREST (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4)).

16. To be in the public interest, the expected benefits of a reservation should be reasonably likely to exceed the costs. Stated another way, the net benefits of a reservation must be greater than zero. The benefit/cost test may be stated in a formula, as follows:

> Net Benefits = Direct Benefits + Indirect Benefits - (Direct Costs + Indirect Costs).

(DFWP Exh. 31, Duffield Dir., p. 4).

17. In general, the benefits and costs of this project are as follows:

Direct Benefits:	Irrigation Crop Revenues, fish and wildlife benefits, municipal benefits
Indirect Benefits:	Maintaining and improving agricultural economic base
Direct Costs:	Irrigation System Capital, Operations, Maintenance and Energy Costs
Indirect Costs:	Foregone instream uses Fish and Wildlife Recreation Hydropower Water quality Economic opportunity costs to parties other than reservant

18. In order to determine the efficient or optimal allocation of water that yields the highest net benefits, the value per acre-foot of water for irrigation, fish and wildlife benefits and municipal benefits should be compared to the value of that water for instream uses, which include hydropower generation, fish and wildlife, recreation, and water quality. The use with the highest value passes the benefit/cost test. (Bd. Exh. 41, p. 38; DFWP Exh. 31, Duffield Dir., p. 6).

19. The direct benefits of water for irrigation on the proposed application was determined by DNRC, based on a detailed analysis of the project. (Bd. Exh. 41, p. 35). For the irrigation part of the application, DNRC estimated net present values for 300 scenarios, accounting for variability in future crop prices, production costs and crop yields for the application. (Bd. Exh. 41, p. 35). The irrigation benefits for each project are the median value today of 70 years of returns, less costs. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., p. 10.) The benefits of each project on an acre-foot basis is set forth in the Final Environmental Impact Statement in Table B-1 under consumptive value method 3.

20. Several assumptions which are favorable to irrigation were made by DNRC in determining the value of water for the proposed projects. (Tubbs Cross, Tr. Day 3, p. 247.)

21. DNRC assumed that the most profitable crop, alfalfa, would be grown on all the acres to be developed, although DNRC's surveys indicated farmers would grow alfalfa on only 65% of the lands to be irrigated. (Tubbs Cross, Tr. Day 3, p. 260.)

22. DNRC assumed that the highest attainable yields would be obtained, based on the assumption that each farmer would have

an incentive to use the best management practices. (Tubbs Cross Tr. Day 3, p. 252.)

23. DNRC assumed water would be available at least eight years out of ten, which is considered the minimum necessary for profitable irrigation operation. (Tubbs Cross, Tr. Day 3, p. 254.)

24. DNRC assumed that alfalfa prices would not be depressed on account of an additional 150,000 acres of irrigated alfalfa production. (Tubbs Cross, Tr. Day 3, p. 253.)

25. Overall the estimations and calculations made by DNRC are accurate and reasonable. (Roger Perkins Cross, Tr. Day 2, p. 13.)

26. The consumptive use values of water for irrigation must also take into account appropriate assumptions concerning the amount of water diverted that will return to the source. (Bd. Exh. 41, p. 38 and App. B.)

27. DNRC initially assumed a 50% return flow from irrigation to the source in calculating irrigation benefits. (DFWP Exh. 31, Duffield Dir., p. 11; MPC Exh. 4, Bucher Dir., p. 3.)

28. This assumption is not valid for this proceeding, as it would overestimate the value of projects using efficient sprinkler systems and underestimate the value of flood irrigation projects. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3; DFWP Exh. 31, Duffield Dir., p. 11.)

29. Estimates of water consumed by the application derived by DNRC's Missouri River water availability model provide the most reasonable estimates of water consumed and return flows. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., p. 3.)

30. The model considers crop water requirements and irrigation efficiencies for the application. (Bd. Exh. 41, p. 38; MPC Exh. 4, Bucher Dir., pp. 8-9; DFWP Exh. 31, Duffield Dir., p. 11.)

31. The direct benefits do not adequately take into account indirect benefits of the project including community stability, growth of agricultural production and maintaining a diverse and healthy rural economy. Although these benefits cannot be quantified they are substantial. (Walkin H. Ranch Exh. 1.)

32. The values of leaving water instream for water quality and fish and wildlife purposes have not been quantified, but do exist. (Bd. Exh. 41, p. 35; DFWP Exh. 31, Duffield Dir., pp 15-16.)

33. Recreation values per acre-foot of water in the Missouri River drainage were calculated as follows using the Contingent Valuation Method of valuing non-market goods.

Subbasin	July-August	Rest of Year
Middle Missouri	$ 5.81	$1.63

(Bd. Exh. 41, p. 38; Bed. Exh. 41, p. 92; DFWP 31, Duffield Dir., p. 32.)

34. Nonmarket valuation methods must be used to value water for recreation. (DFWP Exh. 31, Duffield Dir., p. 29.)

35. As calculated, recreational value is determined on the basis of impacts that would reduce instream flow basinwide. (DFWP Exh. 31, p. 36.) Based on the priority of the DFWP and DHES reservation in this proceeding the impacts to recreation will be minor or insignificant and the dollar amount of those impacts cannot be quantified in comparison to this application.

36. Each acre-foot of water consumed in agricultural use reduces the output of hydroelectric facilities along the Missouri River. The place of use effects the amount of electrical output reduced. In general the higher in the basin the water is consumed the greater the loss of hydroelectric output. (MPC Exh. 3, Gruel, p. 12; Bd. Exh. 40, p. 230.)

37. After a review of all factors, hydropower values for each acre-foot of water consumed by the Bureau of Reclamation are $7.54 per acre-foot. This figure takes into account power generated in Montana, not power generated downstream. (See Bd. Exh. 40, Table 6-43.)

38. Although higher hydropower values are shown in the Final Environmental Impact Statement at p. 39, these hydropower losses include hydropower generated down river and out of the state of Montana. The hydropower losses also do not take into effect the fact that a substantial amount of water left instream is lost to evaporation. (Bd. Exh. 40, p. 42.). The reduction in hydropower loss is also offset in a substantial but unquantifiable amount by the indirect benefits of encouraging economic diversity and economic health of rural areas by allowing further agricultural uses of water (Findings of Fact 38).

39. The Bureau of Reclamation has estimated the per year non-irrigation benefits of the application at 231,000/year allocated as follows:

Fish and Wildlife (Lake Bowdoin) Use	$122,000
BLM Stockponds Use	72,000
Municipal Use	37,000

These values are reasonable. (Special Report, Bd. Exh. 36-A.2, Attachment B, p. 4-40).

40. The per acre value of non-irrigation water to be used by the applicant is $11.05 per acre-foot or $231,000 divided by 20,900 acre-feet.

41. Taking into account all quantifiable values and costs, a comparison of application benefits to hydropower costs per acre-foot of water for all uses of water proposed by the Bureau of Reclamation are as follows:

Water Used for Irrigation Purposes

Value for Irrigation	$13.17 per acre-foot
Value for Lost Hydropower	-7.54 per acre-foot
Net Value of Proposal	$ 5.63

Water Used for Non-Irrigation Purposes

Value for Fish, Wildlife and Municipal	$11.05 per acre-foot
Value for Lost Hydropower	-7.54 per acre-foot
Net Value of Proposal	$ 3.51

42. Based on this analysis, the net benefits of water used for irrigation or non-irrigation purposes exceed costs for this application.

43. Granting instream flow reservations in all reaches requested, granting the application and granting instream flow reservations with priority over the application results in the greatest net benefits to society.

44. No reasonable alternatives to these projects were identified that had greater net benefits.

45. Failure to reserve water for this application will likely result in an irretrievable loss of natural resource development opportunities. (Bd. Exh. 23-A, p. 26 and 27).

46. Water was found to be physically available for this application. (Bd. Exh. 23-A, p. 23-33; Bd. Exh. 23-C, p. 9-12 and 26-28)

47. Although there are adverse effects to other resources that may result from development of the application (Bd. Exh. 23-C, Table 8, p. 23-25; Bd. Exh. 40, p. 191, 197, 204 and 225), these costs were not found to offset benefits of the application

48. One of the adverse effects that would result from development of the application is the introduction of arsenic from the Missouri river into the Milk River drainage.

49. The costs or risks of introducing arsenic into the Milk River are offset by the many positive social impacts of development of the application. Supplementing Milk River supplies would allow the maintenance of irrigation in the Milk River basin. This irrigation provides an economic livelihood for residents of the basin. Development would also be conductive to resolving reserved Indian tribes to the benefit of the state, the federal government and the Indian Tribes. (BOR Exh. 13, Mercer Dir., p. 2-3).

50. If conditioned that the application must comply with all health and water quality laws, these reservations will cause no significant adverse impacts to the public health, welfare, and safety.

51. The benefits of granting a reservation for these projects exceeds those of not granting a reservation.

F. OTHER FINDINGS RELATING TO BOARD DECISION (Mont. Code Ann. § 85-2-316(3)(B), (4)(a)(iv)(b), (5), (6), and (9)(e)(1991); ARM 36.16.107B(5) through (8)).

52. The Bureau of Reclamation has identified a management plan for the developing and financing its water reservation projects (Bd. Exh. 23-A, p. 64-73) as required by ARM 36.16.107B(7).

53. As conditioned, and subject to existing water rights with an earlier priority date, the Bureau of Reclamation's water reservation will not adversely effect any senior water rights pursuant to ARM 36.16.107B(8).

54. The Bureau of Reclamation is hereby granted a water reservation for 68,000 acre-feet per year, to be diverted at a maximum rate of 230 cfs for irrigation, wildlife and recreation, stockwater, and municipal uses.

55. Before construction, this project must be subject to environmental review. (Mercer Red., Tr. Day 5, p. 175).

56. The public interest in protecting domestic and stockwater rights with a priority date on or after July 1, 1985 and perfected prior to the final date of this Order outweighs the values protected by this reservation.

III. CONCLUSIONS OF LAW

1. The Bureau of reclamation is a qualified applicant for a water reservation. (Mont. Code Ann. § 85-2-316(1)(1991).

2. The purpose of the Bureau of Reclamation's applicatior is a beneficial use. (Mont. Code Ann. § 85-2-316(4)(a)(i)(1991); ARM 36.16.107B(1)(b).

3. The need for the Bureau of Reclamation has been established. Specifically, the Bureau has established that thee is a reasonable likelihood that future in-state competing water uses would consume the water available for the purpose of its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(ii)(1991); ARM 36.16.107B(2).

4. The methodologies and assumptions used by the BOR are suitable and accurate.As modified by the Board, the Bureau of Reclamation has established the amount of water needed to fulfill its reservation. (Mont. Code Ann. § 85-2-316(4)(a)(iii)(1991); ARM 36.16.107B(3).

5. Upon a weighing and balancing of the evidence, it has been established to the satisfaction of the Board that the water reservation requested by the Bureau of Reclamation is in the public interest. (Mont. Code Ann. § 85-2-316(4)(a)(iv)(1991); ARM 36.16.107B(4)).

6. Upper Missouri River water reservations approved by the Board shall have a priority date of July 1, 1985. (Mont. Code Ann. § 85-2-331(4).) The Board may determine the relative priorities of all reservations. (Mont. Code Ann. § 85-2-316(a)(e).)

7. The Board may grant, deny, modify, or condition any reservation applied for. In no case may the Board make a reservation for more than the amount applied for. (Mont. Code Ann. § 85-2-316.)

8. The Board has no authority under the reservation statutes or any other statutes to determine, or alter any water right that is not a reservation. (Mont. Code Ann. § 85-2-316(14).)

IV. ORDER

1. Subject to all applicable conditions and limitations (including but not limited to the conditions applied to consumptive use reservations in Exhibits A and B attached to this Order) the application of the Bureau of Reclamation is granted as modified.

2. The reservation is adopted subject to being perfected by December 31, 2025.

3. Relative to other reservations the priority date of the Bureau of Reclamation shall be subordinate to the consumptive use reservations granted to all municipalities and the instream flow rights granted to the Montana Department of Health and Environmental Sciences, Montana Department of Fish, Wildlife and Parks, United States Department of the Interior (Bureau of Land Management), as well as the consumptive use reservations granted to all conservation districts.

4. Any and all liability arising from the reservations or the use of the reservations is the sole responsibility of the applicants. By granting such reservations, the Board on behalf of itself and the Department of Natural Resources and Conservation assumes no liability.

5. The remaining portion of the Bureau of Reclamation reservation for which no development plan has been submitted and approved shall have no force and effect in any basin, subbasin, drainage, subdrainage, stream, or single source of supply for the period of time and any class of uses for which permit applications are precluded.